MASTER OF MILITARY STUDIES
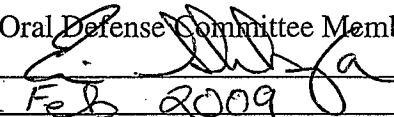

BLUE PRINT TO INDIA'S AMPHIBIOUS FORCES

(Photo Source: Indian Navy's Maritime Military Strategy Document, 18)

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

LT CDR UDAY PINNINTI, INDIAN NAVY

AY 08-09

Mentor and Oral Defense Committee Member: Dr. Eric Y. Shibuya, Ph. D.
Approved: _____
Date: __12 Feb 2009__

Oral Defense Committee Member: _____
Approved: _____
Date: __12 Feb 2009__

	Form Approved OMB No. 0704-0188
Report Documentation Page	

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE **2009**	2. REPORT TYPE	3. DATES COVERED **00-00-2009 to 00-00-2009**

4. TITLE AND SUBTITLE		5a. CONTRACT NUMBER
Blue Print to India's Amphibious Forces		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)		5d. PROJECT NUMBER
		5e. TASK NUMBER
		5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **United States Marine Corps,Command and Staff College, Marine Corps University,2076 South Street, Marine Corps Combat Development Command,Quantico,VA,22134-5068**	8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**53**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

EXECUTIVE SUMMARY

Title: Blue Print to India's Amphibious Forces.

Author: Lt Cdr Uday Pinninti, Indian Navy

Thesis: India is a nation blessed with a geographically strategic position, a vast coastline and numerous island territories and is emerging as one of the lead players in world affairs. India also has numerous security challenges--terrorism being the most potent of them. The emergence of India as a lead player in the back drop of these challenges requires a reconsideration into its armed forces structure, more specifically a consideration of her amphibious capability. Does India need an amphibious force? If yes, what would be the role of such a force for India's security?

Discussion: India has seen robust growth in its economy in the recent years. This growth has seen the country slowly emerging as a major player on the global arena. With this new stature have come increased responsibilities, threats, and challenges. These challenges develop rapidly and have seen India's armed forces operating tempo increase manifold and operate in countries from Lebanon to Indonesia. These include terrorism leading to extra vigilance along India's coast and island territories, piracy and its threat to India's energy security, peace-keeping operations, non-combatant evacuation operations, humanitarian assistance and disaster relief operations to name a few. Most challenges develop rapidly and call for rapid response and it would be ideal for a composite force, with the wherewithal and ability to operate independently-- both within and at distances from India, to deal with them. The carving out of an independent amphibious force from the existing defense structure would enable India to assemble the ideal force that is capable of operating independently. This independent force would be India's "force in readiness" and the first military response prior to induction of additional forces as the circumstances dictate. Therefore there is an urgent need to develop a modern, well equipped, and competent amphibious force that has the advantage of being staged at sea for prolonged duration while a situation is still evolving and capable of being deployed at immediate notice.

Conclusion: With the increase in commitments, it is but natural that India's Armed Forces will be called upon to don the mantle of carrying India's flag across the oceans and continents. In the back drop of such a setting India definitely needs an amphibious force. This is to ensure that India is not caught flat-footed when its interests/ territories are at stake, Indian Diasporas are in need of succor, India's allies or any nation requires assistance and asks for it.

DISCLAIMER

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

QUATATION FROM, ABSTRACTION FROM, OR REPRODUCTION OF ALL OR ANY PART OF THIS DOCUMENT IS PERMITTED PROVIDED PROPER ACKNOWLEDGEMENT IS MADE

Illustrations

Tables

Table of Contents

List of Abbreviations

MARCOS	Marine Commando Force
HADR	Humanitarian Assistance and Disaster Relief
NEO	Non-combatant Evacuation Operations
IOR	Indian Ocean Region
SLOC	Sea Lanes of Communication
IPKF	Indian Peace Keeping Force
AMPHEX	Amphibious Exercises
NAM	Non-Aligned Movement
G-15	Group of 15 Nations
LPD	Landing Platform Dock
LSTH	Landing Ship Tank and Helicopter
LHA	Amphibious Assault Ship
LHD	Landing Helicopter Dock
LSD	Dock Landing Ship
MMS	Multi-Mission Ship
LCU	Landing Craft Utility
LCAC	Landing Craft Air Cushion
CISC	Chief of Integrated Defense Staff to the Chiefs of Staff Committee
COSC	Chiefs of Staff Committee
ISL	International Sea Lanes
MCPP	Maritime Capability Perspective Plan

Preface

I felt that coming to the Marine Corps Command and Staff College and not learning about the importance of the Marine Corps as a "force in readiness" would go against the very purpose of my learning process. And what better topic to do my dissertation on than exploring the possibilities of an Independent Amphibious force for India (India's Marine Corps).

I would like to acknowledge the guidance given to me by my mentor, Dr. Eric Y. Shibuya, without whom I would have been "all at sea." I would also like to acknowledge the advice given to me by Brigadier Jatinder Sikand, Indian Military Attaché, Embassy of India Washington D.C. I am also grateful to Commodore Monty Khanna, Indian Naval Attaché, Embassy of India Washington D.C whose constant support, encouragement and guidance helped me complete this thesis.

I also have had the privilege of being educated and guided on the topic by Lt. Col. Christopher A. Arantz and Lt. Col Darrin Denny of the United States Marine Corps. I also received useful inputs from Lt Cdr Clemente Gil of the Portugal Marines, Major Jose Ignacio of the Spanish Marine Corps, Major Ronald Schepel of the Netherlands Marine Corps, Major Herve Pierre of the French Marines and Major Ian Langford of the Australian Army as also all the officers of Conference Group 1 of Command and Staff College 2008-09. I am truly privileged for getting their inputs and suggestions.

Finally I would like to acknowledge the support and patience displayed by my wife, Jyoti who has always been my pillar of strength and our two and a half year old daughter Bhavana who on most occasions felt she could do a better job than me.

Introduction

India is a nation blessed with a geographically strategic position, a vast coastline and numerous island territories. Though economic liberalization in India can be traced back to the late 1970s, economic reforms began in earnest only in July 1991.[1] India's real Gross Domestic Product (GDP) grew 5.7 percent annually during the 1990s and accelerated to 6.4 percent, on an average, annually during 2000-08 making India the second fastest growing major economy in the world during each period after China (See Figure 1, pg 33). India's economy, as measured by GDP, is Asia's third largest after Japan and China[2] and is currently in the world's top five economies.[3] However this does not mean India has attained the status of a developed nation. It is still a developing nation with a spiraling population, disparity of wealth, poverty, poor infrastructure, and illiteracy. Despite these limitations, India has been able to establish respect for itself in the community of nations. India's economic resurgence has meant the country's security concerns and interests extend far beyond its immediate neighborhood[4]. Therefore, this resurgence has seen India evolving as one of the lead players in modern day world affairs.

However, there are issues that are proving to be a hindrance in India's transition into a lead player in global affairs. The first issue is the lack of a decisive response to acts of terrorism on Indian soil and on Indian interests around the world eroding India's credibility. The second issue is improvements in humanitarian assistance and disaster relief (HADR) efforts in the event of natural calamities, primarily in the form of faster dispensation of relief materials and restoring of infrastructure to ensure commerce is not affected. The final issue is of piracy off the Horn of Africa which is threatening India's energy security and freedom to do business off the coast of Africa. The current global meltdown only complicates this picture as nations could compete or co-operate to sustain own economies. This coupled with the expansion of Indian Diasporas

would need India to have adequate forces readily available to render assistance, as the circumstances demand, in any theatre of operations. This also needs to be considered in the backdrop of India's two island territories; Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep Islands in the Arabian Sea--at considerable distances from mainland India and straddling some of the most critical international sea lanes of communication (ISLs) of the world. Their location and distance from India reinforce their criticality to India's security (See Figure 2, pg 34).

Therefore, along with protecting India's territories, diasporas, and interests; India's defense forces may need to render assistance to countries that are crucial to India's strategic and economic well being and also to further India's diplomatic foot print as directed by the government. Considering the distances at which the force may require to operate, it would be ideal for the force's composition to include all arms of the defense forces and be totally self sustaining. This would mean a composite force which would include constituent elements of the Army, Navy and Air force--troops, ships, and aircraft. The troops would require operating off ships for operations on land and thus need to be amphibious in nature. This force would be India's "force in readiness" [†] for any immediate response. Therefore, if India does stand up a dedicated amphibious force, what would be the role of such a force be for India's security?

India

India is one of the oldest civilizations in the world. It has achieved multifaceted socio-economic progress during the last 59 years of its Independence. India is the tenth most industrialized country in the world and the sixth nation to have gone into outer space. It covers an area of 3,287,263 sq km, has a coastline of approximately 7600 kilometers, numerous island

---

[†] **Force in Readiness** - Military forces maintained in a state of preparation for immediate employment without additional reinforcement, training, or provisioning. (Source: Answers.com Military Dictionary "Force in Readiness," http://www.answers.com/topic/force-in-readiness (accessed January 24, 2009)).

territories, and is the seventh largest country in the world. India is bounded by the Himalayas in the north; it stretches southwards and at the Tropic of Cancer, tapers off into the Indian Ocean between the Bay of Bengal on the east and the Arabian Sea on the west.[5] India's most crucial assets but critical vulnerabilities too are its island chains of Andaman and Nicobar in the Bay of Bengal and Lakshadweep in the Arabian Sea. These island chains are the key to the some of the World's most crucial waterways. India's size, strategic location, trade interests and security environment underpin India's strategic and security response. In view of this strategic spread, it is essential for the country to maintain a credible land, air and maritime force to safeguard its security interests. India's geographical and topographical diversity, especially on its borders, poses unique challenges to our armed forces in terms of both equipment and training.[6] Also the unique geographic location leads to the strategic importance of India and brings to fore the question: what is India's strategic outlook? What are India's strategic concerns and what steps does India need to take to mitigate these concerns? (See Figure 3, pg 35)

India's Strategic Outlook

"From this ship I look at India and think of our country and its geographic situation - on three sides there is the sea and on the fourth high mountains - in a sense our country maybe said to be in the very lap of an ocean. In these circumstances I ponder over our close links with the sea and how the sea has brought us together. From time immemorial the people of India have had very intimate connections with the sea. They had trade with other countries and they had also built ships. Later on the country became weak. Now that we are free, we have once again reiterated the importance of the sea. We cannot afford to be weak at sea ... history has shown that whatever power controls the Indian Ocean has, in the first instance, India's seaborne trade at her mercy, and in the second, India's very independence itself."

Pandit Jawahar Lal Nehru[7]

The above quote by India's first prime minister encapsulates the country's strategic interests. India sits astride nine important passages providing access into the Indian Ocean, of which five are key energy Sea lanes of communications (SLOC)[8] (see Figure 4, pg 36). Access to the Indian Ocean can be controlled by these choke points through which much of the world's commerce flows. Some of the geo-political factors affecting this region are border delineations--

a colonial hangover, rise in population in the Indian Ocean Region (IOR) and maritime trafficking.[9] These factors have led to the existence of localized conflicts and crises. There is widespread proliferation of modern hi-technology weapons and sensors in the IOR. The scenario is further complicated by terrorism and its maritime component. The latest trend that is threatening the very tenets of maritime trade is piracy along the African coast. The issue of piracy has seen all major navies pitted against pirates, originating from Somalia in nothing more than small speed boats. The price being paid due of this piracy is freedom to use the seas to further economic prosperity. India's economic resurgence is directly linked to her maritime trade and energy needs, most of which is transported by sea.[10] India's economic resurgence and its defense and foreign policies are mutually dependent. This was clearly enunciated by K.C Pant, the then deputy chairman of the Indian Planning Commission who on October 13, 1999 remarked;

> "India's economic policy should further its defense and foreign policy interests and vice-versa while the country's defense strategy must look beyond present threats and capabilities. A holistic approach to national security demands that the nation strengthen both its economy and its defenses and that defense policy, foreign policy, trade policy and internal security policy - all buttress each other."[11]

This strategic outlook of India, in consonance with her economic, foreign and defense policies, guides her actions. These actions are also influenced by India's security objectives and concerns.

India's Security Objectives and Concerns

India's security concerns are defined by a dynamic global security environment and the perception that South Asia region is of particular global security interest.[12] This is primarily due to the global ramifications of the ongoing military campaign in Afghanistan and associated dangers of terrorism. The recent terror strikes in Mumbai, India are a mute reminder of the potent risk posed by terrorism in India and the rapidity with which the situation develops.[13] Also, a recent study by RAND Corporation states that India is likely to face more terror attacks. The

study also states that India has turned out to be a terribly soft state neither able to prevent many

of the terrorist acts that have confronted it over the years nor capable of retaliating effectively

against either its terrorist adversaries or their state sponsors.[14] The report further argues that

India lacks military options that have strategic-level effects without a significant risk of a

military response from its adversaries.[15] This study does not bode well for a nation on the

threshold of a role in global affairs. The continuing presence of terrorist and fundamentalist

forces in its neighborhood has prompted India to maintain a high level of vigilance and

preparedness to face any challenge to its security. The country faces a series of low intensity

conflicts characterized by tribal, ethnic, and left wing movements and ideologies as also the

proxy war conducted by and from neighboring countries. India is also affected by the trafficking

in drugs and proliferation of small arms. There is also the ever present possibility of hostile

radical fundamentalist elements gaining access to the weapons of mass destruction in India's

neighborhood. Finally there is the fact that India is surrounded by two neighbors with nuclear

weapons and missiles and history of past aggressions and war. India's national security

objectives have evolved against a backdrop of India's core values--democracy, secularism and

peaceful co-existence and the national goal of social and economic development. The national

security objectives are:

       a. Defending the country's borders as defined by law and enshrined in the Constitution.

       b. Protecting the lives and property of its citizens against war, terrorism, nuclear threats and militant activities.

       c. Protecting the country from instability and religious and other forms of radicalism and extremism emanating from neighboring states.

       d. Securing the country against the use or the threat of use of weapons of mass destruction.

       e. Development of material, equipment and technologies that have a bearing on India's security, particularly its defense preparedness through indigenous research, development and production, inter-alia to overcome restrictions on the transfer of such items.

f. Promoting further co-operation and understanding with neighboring countries and implementing mutually agreed confidence-building measures.

g. Pursuing security and strategic dialogues with major powers and key partners.[16]

Based on the strategic perspective and security concerns highlighted, India's Armed Forces have issued their respective doctrines to lay out what each service brings to the fight to safeguard the country and further India's goal of becoming a key global power. The latest doctrine promulgated is India's Joint Doctrine for Amphibious Operations released on Sep 9, 2008.[17] But, why do nations have amphibious forces and what role do such forces have?

Role of Amphibious Forces

Historically nations have used and maintained amphibious forces for policing, anti-piracy, enforcing a nation's policies, and humanitarian assistance (See Annexure A – History of Amphibious Forces, pg 23). The world today is faced with many challenges, be it natural or manmade. These challenges are forcing the international community to consider armed intervention as one of the viable options. The most efficient and effective way of achieving these interventions in a silent and unobtrusive manner is from the sea--naval ships with amphibious forces embarked provide the right answer. The intervention could be for non-combatant evacuation operations (NEO) or for a HADR mission. This is primarily due to the fact that naval forces, unlike air or land forces enjoy the advantage of maintaining off the coast of an area of unrest in international waters. Naval forces can sustain without friendly ports, till such time matters come to a point where intervention is warranted, unlike air/ land forces for which friendly airbases or land bases are a pre-requisite. The naval forces also have the advantage of unlimited endurance, provided they have an established supply train. The availability of a force that is well trained and suitably equipped to tackle any kind of situation gives any country's leadership enormous flexibility in making key strategic decisions. The above when considered in

India's context leads one to the question, what is the present state of India's amphibious capability?

India's Amphibious Capability

The earliest known instance of Indian involvement in amphibious operations was as a part of the British assault at Tanga, German East Africa in 1914.[18] This was followed by Gallipoli (Dardanelles), where the Indian troops fought side by side with the New Zealanders in 1915.[19] This continued in the Second World War, as Indians were a part of the Allied forces.[20] The only other conflict where India's amphibious capabilities were used was during the Indian Peace Keeping Operations in Sri Lanka between 1987 and 1990.[21] The operations in Sri Lanka by the Indian Navy, code name Operation Pawan, saw the Navy using its assets to transport and maintain the Indian Peace Keeping Force troops (IPKF). The Indian Navy, along with the mercantile marine, was involved in the transfer of 200,000 men ferried in both direction, 100,000 tons of stores, and 8,000 vehicles.[22] These operations also gave the world its first view of the Indian Navy's Marine Commandos (formerly the Indian Marine Special Forces), a Special Forces unit, created by in 1987 for special maritime operations [23] (see Figure 5, pg 37).

India's current amphibious forces are a combination of the Indian Army and the Indian Navy. The Navy provides the platforms and towards this maintains a fleet of landing ships[24] whilst the Indian Army provides the troops from the 340th independent Brigade, raised as a special maritime unit, for amphibious operations.[25] A look at Indian Navy's lift capability clearly shows that the Indian Navy has a lift capability of 4950 troops (see Table 1, pg 29). Therefore India has the capability to position a Brigade size amphibious force in a theatre of operations within 1,000 Nautical Miles (range of Sl.d, Table 1, pg 29). The current amphibious assets are

good. And if India already has an independent brigade, then why does it need a specialized amphibious force?

Justification for an Independent Amphibious Force

Indian armed forces have demonstrated on various occasions their capability to handle rapidly developing situations (See Annexure B – Indian Armed Forces in Various Conflicts/ Missions, pg 25). Though India has delivered in the past, the global scenario is rapidly evolving and every country needs its armed forces to stay "in sync" with this evolution. The ideal first response to a rapidly emerging scenario is a "force in readiness." This is true in India's context too. Also to continue developing at a rapid pace, India would need to sustain and develop its industry and infrastructure. The key to this is energy. Therefore to ensure that her energy needs are not compromised India, which is heavily dependent on oil and gas imports, has acquired stake in oil and gas exploration blocks in many areas across the globe, especially Africa.[26] These would need to be protected. In the back drop of the fact that Africa is a continent with internal strife, India would need to have a force readily available/ deployed to safeguard its national interests. This force will provide military flexibility to the Indian leadership whenever a situation develops threatening India and its interests. India does currently possess amphibious capability.

The advantage of the existing setup is that each service continues to maintain its independent identity and the amphibious force/ required task force assembles together only in times of an operational requirement. However, they continue to exercise as per laid down schedules in Amphibious Exercises (AMPHEX)[27]/ other joint exercises to validate joint amphibious doctrine and hone inter-operability skills. The biggest disadvantage of this setup is that this does not stop each individual service drawing up its own priority list which, in a worst case scenario could mean non-committing of required forces for a joint amphibious operation

due to service exigencies. To illustrate this further, though the Indian Army has an independent Brigade for amphibious operations, it is still a part of the Army. If there are conflicting operational requirements of equal magnitude--an Army specific mission to an amphibious mission and if it is possible to undertake only one due to the availability of forces, the Army in all probability will deploy the Brigade for the Army specific mission. By doing so, the Brigade will not be available for a mission where dedicated amphibious troops are required. This could jeopardize the amphibious mission if make shift amphibious troops are utilized, especially if it is opined that the Brigade is better suited for the Army specific mission too. And, it is not possible for any set of troops to become "amphibious."

The primary reason for an independent amphibious force is, to conduct any amphibious operation, the planners and the force need to have an amphibious bent of mind. This can only be achieved if the force is truly amphibious in nature and not wearing a dual hat. To conduct any amphibious operation, it takes specialized training. This entails concepts of land warfare interwoven into the training curriculum, but more specifically the amphibious platforms as the departure point. Also, the force should be aware of the critical limitations of an amphibious operation like tidal patterns and withdrawal from the area of operations. This attitudinal approach can be developed if the force is "breathing, eating, walking, talking, and sleeping" amphibious operations. The force would need to appreciate the vagaries of surf conditions, beach conditions and be capable of operating equipment designed specifically for amphibious operations.

In today's world when countries are trying to develop cohesive and well trained forces for tackling issues which are of importance to those countries, an independent and well trained amphibious force may be the best method to further India's amphibious capabilities. Also an independent force would ensure that India does not have to learn the lesson of "cohesiveness" at

a later time at a much greater cost. Therefore if the amphibious force is independent, what should it look like?

Recommended Force Structure

India has always propounded peaceful co-existence and the path of non-violence. However, with the ever changing scenario of both global and regional geo-politics, it is but natural for India to play a more pro-active role in uncertain times. With India's role on the global arena only increasing, what are the missions which India's forces, in particular its amphibious forces, likely to be tasked with? If the past can be used as an indicator, India and her forces may be called upon to assist in NEO, HADR operations, international policing against piracy, and peace-keeping operations. These, therefore should be the main missions that India's amphibious force should be ready to handle. This needs to be also considered in the backdrop of the fact that most of the world's population is moving to live within 60 miles from the coast--thereby increasing the risk from natural calamities and disasters.[28] Finally, with the ever increasing specter of non-state actors and associated violence, the amphibious force should also be equipped for and capable of handling forced entry missions to safeguard India's interests and her populace. The present amphibious force levels may make many feel that India has adequate platforms for power projection and also any HADR missions with enough ships and troops. But a closer look will reveal a different story. Most of the amphibious vessels that the Indian Navy currently has in its inventory are old. This coupled with the Indian Army's pre-occupation with defense of India's land frontier and internal defense issues[29] could jeopardize the existing amphibious preparedness and capability of India. The only way to plug this likely operational limitation and provide the nation a "operational wildcard"[30] is by rapidly evolving a national consensus on the requirement of an amphibious force that can be used as "force in readiness" for any contingency.

Another important fact that needs to be understood--the amphibious force would need

contributions from all the three branches of India's defense services. The Army would contribute

in terms of troops and land equipment, the Navy ships and aircraft and the Air force its strategic

lift assets and mid-air refueling aircraft. The key components of the "Force in Readiness" are: -

 a. The troops for carrying out the required operation.

 b. The platforms (ships and aircraft) required to carry the troops to the areas of conflict/

humanitarian relief.

 c. Training for the personnel.

 d. The Command and Control of the force.

 e. Basing the force at an ideal place for flexibility of operations.

 f. The financial implications of organizing and sustenance of the force.

Troops

The Indian army numbers about one million personnel and fields 34 divisions.[31] In

1983, the 340th Army Independent Brigade, which had a force of three infantry battalions at

Trivandrum, was raised as a special maritime unit.[32] The Independent Brigade Group integrates

all arms and services for sustained independent operations. There is great flexibility in their force

mix, and in 'grouping for tasks'.[33] This Independent Brigade Group should be the backbone of

India's amphibious force. The group however needs certain modifications. The ideal

composition would be two infantry battalions and one parachute battalion along with other

supporting arms. This composition should further be modified to create three composite

battalions of troops which would include in them a company of parachute troops. The parachute/

airborne troops would give the flexibility for airborne assault/ deployment as required. The

reason for this mix being that by employing airborne forces, the commander can expect to

exploit such tactical advantages as surprise, shock, and the enemy's inability to predict probable

direction and location of attack.[34] This employment is in a hostile scenario. The main advantage

of using infantry battalions is their available skill set in civil operations. Infantry undertakes numerous civic action projects like providing medical facilities to local residents especially in remote areas. It is the first one to be mobilized in any natural calamity, be it an earthquake, floods, avalanche or a train accident. In remote areas, a number of welfare projects have been initiated for the development of the local residents.[35]

The successful conduct of an amphibious operation is dependent to a major extent on the reconnaissance of the target beach. This is a job normally entrusted to Special Forces by all major amphibious forces across the world, the United States Marine Corps Force Recon[36] being a case in point. In a quest to harness this capability the Indian Navy created the Marine Commando Force (more commonly known as the MARCOS).[37] The new amphibious force would therefore need to have the MARCOS as one of the components of its force structure. Though there could be a natural temptation to use the MARCOS as "naval infantry" and center the Indian amphibious force around MARCOS as the land component, this temptation should be overcome. The MARCOS is a specialized unit for covert operations and using it as a regular infantry could dilute its standards. Therefore, the land component of the amphibious force should be troops of the Indian Army with the MARCOS being used strictly as Special Forces unit only for beach reconnaissance and for the covert part of any amphibious operations. The battalions should be identical in their composition and at any time one of the battalions should be the "force in readiness" with the other two being involved in training activities, rest and recuperation.

Platforms

a. Ships. The Indian Navy is the custodian of the specialized ships and craft required for amphibious operations. However a close look at the speeds of these vessels brings out the fact that only the Landing Platform Dock (LPD) and the five Landing Ship Tank and Helicopter

(LSTH) are capable of any meaningful speeds, speed being an important component whether it is an operational requirement or a humanitarian mission. This coupled with the antiquity of the ships brings to fore the necessity to commission new amphibious ships into the Indian Navy. The commissioning of *Jalashwa*, the Austin Class LPD was a step in the right direction. However the ship is actually fairly old as it was first commissioned in 1971 in the U.S. Navy.[38] This need for new ships raised an interesting point for deliberation. What type of amphibious vessels would suit India's requirements?

India needs amphibious ships that are capable of dual role, both in war and peace. This would ensure that the entire spectrum of India's likely requirements--from strategic lift and pre-positioning to humanitarian missions are capably handled. Considering the type of missions with which India's amphibious forces may be tasked, the platforms which could be of use to India include the multi-purpose amphibious assault ship (LHA), Landing Helicopter Dock (LHD), Dock Landing Ship (LSD), and the LPD. India's Tsunami operations highlighted the lack of strategic sea lift and this saw India acquiring the ex- *Trenton* from the United States (See pg 25). It is understood that India is likely to construct at least three more ships of the LPD class in the next ten years.[39] But will induction of only LPDs help solve India's requirement for force projection and HADR? This needs to be considered in the backdrop of the already stated possible mission requirements of India's amphibious forces. For the force to be truly self-sufficient, it will need a strong aviation element and logistic support. This element cannot be staged from only LPDs. The force would need platforms with capabilities to sustain the aviation and logistics piece. Therefore LPDs alone will not solve India's requirement. Ships that are capable for a variety of missions, as being considered in Australia--Multi-Mission Ship for the Australian Defense Forces could make better sense for India too.[40] The main point of consideration for any

nation when it goes in for defense acquisitions is the cost versus utility or in more colloquial terms "the bang for the buck". Therefore exploring the capabilities of the potential choices before considering the right combination/ right platforms for India is useful (see Table 2, pg 30).

The **LHD or LHA** amphibious assault ships, displaces 40,000 tons (approx) in full load and are capable of carrying up to 1700 troops. The biggest advantage these ships have is their ability to operate Short Take Off and Vertical Landing (STOVL) fighters. The capability to carry the STOVL fighters coupled with helicopters makes the LHA/ LHD potent platforms for amphibious operations. The STOVL fighters give these ships the capability to provide both air defense protection to the amphibious ships along with hostile beach defense destruction/ suppression and fire support to the landing troops. Thus these ships are capable of ensuring "sea control or sea dominance". The ships can also be used extensively in HADR missions as the available space onboard can be very effectively used for carrying relief materials. Also the medical facilities onboard include beds for 600 patients and six operating rooms and extensive dental facilities.[41] This gives the political leadership and the operational commander the advantage of using these ships for HADR missions or for use either in an amphibious operations role or an aircraft carrier role. These roles, when juxtaposed with India's desire for a three carrier Navy,[42] are all the more reason for India to go in for an LHA or LHD rather than the aircraft carrier. The LHD has the capability of carrying more three times more Landing Crafts Air Cushion (LCAC) than the LHA. However when this is compared to the LCU (utility landing craft) carrying capacities of both these ships, the LHA can carry four to the two that can be carried by the LHD.[43] The utility value, when weighed of the LCAC, post service life extension program, versus the latest version of the LCU, the LCU gets the upper hand due to its cargo lifting capability--225 tons of cargo to the 70-140 tons that can be lifted by the LCAC[44] (See

Table 3, pg 31). This lift capability would be invaluable when carrying relief supplies or for evacuating personnel. Also, the LCU can be used in riverine operations, which on many occasions could be a subsidiary mission for the amphibious force.[45] Thus when compared, the LHA with LCUs could be a better platform in comparison to the LHD. A tabular comparison of the capabilities of the LHA and LHD reinforces the above conclusion. The LHA will give the Indian Navy the flexibility of using these ships as required, dictated by operational circumstances. A point to consider is that India does not need to go in for the LHA which displaces 40,000 tons; though there are obvious advantages of going in for the larger LHA in terms of troops and aircraft that can be carried, the number of LCUs that can be carried, and hospital facilities onboard. India can go in for the smaller LHD capable of carrying up to 1000 troops, the Australian Canberra class[46] and the Spanish mid-size landing helicopter dock[47] displacing 20,000 tons - 25,000 tons being examples. One point that needs to be borne in mind, though, is the requirement of having good command and control capabilities for controlling an amphibious operation/ any operation in the sea from onboard the ship with associated aircraft and helicopter control and communication capabilities.

The **LPD and LSD** are smaller but competent amphibious ships when compared to the LHA or the LSD. The LPD is a development of the dock landing ship (LSD) design, which had its origins in World War II; the LPD design provides for increased troop and vehicle capacity and a relatively small docking well.[48] The LPD/ LSD do not carry fixed wing aircraft akin to the LHA/ LSD. These ships are more useful for carrying bulk cargo, troops, and vehicles. The latest version of LPDs can accommodate two LCACs in comparison to one in the older design LPDs[49] and two/ three in the LSDs[50] and these ships displace between 17,000 tons – 24,000 tons.[51] The LPD can carry 720 troops and have a 24 bed medical facility with two operating rooms[52] whilst

the LSD can carry about 500 (+) troops.[53] However the LSD (cargo variant) has more cargo carrying capacity in comparison to the LPD as also can carry more LCUs. Considering the capabilities of the LPD and the LSD (see Table 2, pg 30), it would be ideal to have a mix of both the platforms for the Indian Navy.

There is a school of thought in the Australian defense forces about the advantages of having a **Multi Mission ship (MMS)** rather than a ship with a specific class type. It is suggested that the multi-mission ship will combine the capabilities of missile coverage of local airspace, carry large quantities of equipment, personnel, supplies, troop lift helicopters, armed reconnaissance helicopters as also the joint strike fighter, and the Abrams tank.[54] This will also bring the advantage of being self-contained when deployed due to its weapon and aircraft package.[55] However, considering the fact that this is a concept that is still on the drawing board and may take time to fructify this may not be the ideal platform for India at the present juncture. The reasoning for this primarily being the cost that may be involved in research and development and the final cost of the platform as also the commonality of the air craft and other equipment fit onboard. The other point of consideration is that when considered in the backdrop of the possibility of two diverse missions coming up simultaneously--an amphibious assault/ Humanitarian Mission in one place and an escort mission in the other, the MMS could pose some challenges to the operational commander.

    b. <u>Aircraft and Helicopters</u>. The Indian Armed forces, primarily the Navy, operate the Sea Harrier fighter aircraft; the Sea King, Kamov and Chetak helicopters.[56] The Indian Navy is also set to receive the MiG-29K fighter aircraft from Russia shortly.[57] With these aircraft already being in the inventory and the skill-set being available for their maintenance, it would be prudent for India to consider continuing with the MiG-29K/ Sea Harrier fighters and the Sea King

helicopters, albeit the latest variants, for positioning on the ships for air defense/ air superiority and troop/ equipment movement. It would however be useful to see if there are better helicopters available for troop and equipment/ stores movement which could be more advantageous than the Sea King helicopters. The Indian Air force, with its current inventory of strategic lift aircraft and air-to-air refuellers, will have to modify its doctrine to dovetail the requirements of the amphibious force.

Training

General George S. Patton once remarked,[58] "The more you sweat in peace, the less you bleed in war." This famous quotation captures the very essence of the role training has in the preparedness of any nation's armed forces. The Indian Armed Forces, being one of the largest in the world, have a very rigorous and well planned training curriculum which permeates to all the services. Once India gets a dedicated amphibious force, this force would need to be dovetailed into the training curriculum of the armed forces. This would include training of the amphibious force itself and training of other services with this force for integration and inter-operability. The issue that is most critical is a training establishment that can cater for all aspects of training for the amphibious forces. India, in an effort to train its forces in the art of amphibious warfare, is setting up an amphibious warfare training school under the aegis of the Indian Navy at Kakinada.[59] This would be the ideal place to train India's amphibious forces. India would need to study the training models of some of the advanced amphibious forces in the world to glean the right training fundamentals that would help in training a "force in readiness". The curriculum would need to include training for missions that include--forced entry operations in a conventional and insurgency environments, NEO, peace keeping operations, HADR operations and assistance to civil authorities when ordered by the government of India.

Command and Control

After the 1999 Kargil conflict, India carried out an in depth analysis of the country's security management system and out of this was born the Integrated Defense Staff.[60] The primary role of the Chief of Integrated Defense Staff to the Chiefs of Staff Committee (CISC) is to support the Chairman and the Chiefs of Staff Committee (COSC) in the optimal performance of their role and functions.[61] As part of the integrated defense staff, the Andaman and Nicobar integrated theatre command was set up on October 8, 2001 with head quarters at Port Blair.[62] This command has assets and officers from all the individual services of the Indian Armed Forces in the operational and organizational set up.[63]

The amphibious force, being a "force in readiness", will have components of all the three service arms of the Indian Defense Forces. The ideal place for this force would be under the aegis of the Integrated Defense Staff. Therefore the amphibious force should be placed under the unified command, with its own independent identity. This will ensure force would have the umbrella of joint planning thereby avoiding individual service parochialisms as also to ensure that the planning caters for all three dimensions of warfare--air, land and sea. The integrated theatre command can ensure that the force gets the required resources from individual services. The amphibious force will be able carve its own identity, devoid of any pressures from individual services. With the integrated command element being available, the force can be deployed at very short notice making it truly a "force in readiness". The Command element of this force would need to have officers of the rank of Brigadier and equivalent from the three defense services of India who would be supported by their planning staffs. The advantage of planning and working together would go a long way in achieving synergy which is the hall mark of joint operations. The senior most amongst the command element would head the force and be

responsible to the theatre commander. The assets for the amphibious force would need to be with the force itself, other than the LHA class vessels and fixed wing aircraft/ fighters which would be performing their task in the dual role of an aircraft carrier and amphibious assault ship as the circumstance dictate. This availability of assets would ensure that the force has the wherewithal to continuously train and to deploy at immediate notice.

Basing the Force

a. Areas of likely deployment. The region/ areas where India's amphibious force, as the "force in readiness", is likely to be deployed are dictated by India's strategic outlook and commitments. India's region of interest is primarily in the Indian Ocean Region. The Primary areas of interest include the Arabian Sea, the Bay of Bengal, and choke points leading into the Indian Ocean, the Island countries, the Persian Gulf, and the principal international sea lanes of communication (ISLs) crossing the Indian Ocean Region. The secondary areas of interest include the Southern Indian Ocean Region, the Red Sea, the South China Sea and the East Pacific Region.[64]

b. The Base for the Amphibious Force. Considering the pre-requisites above that the base for the amphibious force requires, the most ideal places that can be used for basing the amphibious force are Mumbai and Kochi on India's Western Sea Board, Chennai and Visakhapatnam on the Eastern Board and Port Blair in the Andaman and Nicobar Islands.[65] Ideally only sea ports should be considered because valuable time should not be lost in transferring the amphibious forces from inland to the port for embarkation on ships. A comparison of the distances involved from the principal ports mentioned above with respect to India's area of interest (see Table 4, pg 32) brings out the fact that the most ideal place for positioning of the force would be Kochi, on the Western Sea board of India(see Figure 6, pg 38).

Kochi would also give the added flexibility of deploying the force in any of the island territories in the Indian Ocean Region at a much faster pace, other than if the force was based in port Blair in case of a contingency in Port Blair.

The Financial Implications and Timeline

The cost of defending a nation's territorial integrity and interests does not come for a small price and similarly the cost of the equipment for doing so too does not come at a small price. If we try to place a price tag on the likely cost of each of the platforms proposed for India's amphibious forces; the LHA/ LHD would cost anywhere between US$800 million to US$ 2 billion (based on the cost of the Australian Defense Forces LHD program[66] and the WASP class LHD program costs[67] respectively), the LSD and LPD would cost up to US$ 1 billion and these costs are not including the aircraft that need to be positioned on this platforms. The requirement to provide a credible number of platforms to ensure adequate lift capability would entail India to acquire/ build at least two LHA/ LHDs and two LPDs and two LDSs to start with. This number would ensure the availability of adequate platforms as also give the leeway for maintenance and upgrade of these ships as per the maintenance schedules. That would mean India is looking at a bill of approximately US$ 10 – 12 billion to procure these platforms. If the price is compared with India's defense budget for the financial year 2008-09 of US$ 26.4 billion,[68] we are looking at a very large price tag. This assumes significance when taken in the backdrop of the many areas where this money can be gainfully employed. But when the price tag is compared to the strategic and operational gains that the acquisition of these ships will accrue to India the price is justifiable. The cost versus benefit analysis, when carried out for an amphibious force for India, clearly brings out the fact that India will benefit immensely from a dedicated amphibious force.

The Indian Navy's Maritime Capability Perspective Plan (MCPP) outlines the force structure of the Indian Navy till 2022 and highlights the types of platforms--ships, submarines and aircraft--that need to be maintained with state-of-the-art technology weapons and sensors. The plans have been drawn up keeping in mind the envisaged budgetary support required to maintain a force level of approximately 140 ships with greater thrust on quality of the punch of the platform as opposed to mere quantity.[69] The ships required for expanding the amphibious capability and equipping India's amphibious force with the right platforms would need to be incorporated into the MCPP. This would ensure that by 2022 India's amphibious forces are equipped with all the platforms required; two LHA/ LHDs (in lieu of India's desire for dedicated aircraft carriers), two LPDs, and two LSDs. In the interim the first step would be to assemble the troops and get the command and control aspect in place. The force needs to be independent, and trained in amphibious warfare. This assembling and training of the force needs to be completed within the next five years. The Indian Air force already possesses the strategic lift assets that it needs to bring to the effort. The Indian Navy can continue using its available ships for training and moving the forces to required theatre of operations till it commissions the ships specified above. Therefore, India's independent amphibious force should be able to commit to its first operation maximum by 2014 and should be able to carry out its operations on the ships and craft of its desire by 2022. By 2022, based on the experience gained, the force could expand from the suggested one Brigade to a larger strength.

Conclusion

India is a nation on the fast track. The country's economy is performing well, the nation has favorable standing in the community of nations, and the country's commitments--both within the area of influence as also beyond the area of influence are only on the rise. These

include peace-keeping missions, humanitarian assistance, NEO operations, and anti-piracy missions to name a few. This is with the Omni-present threat of terrorism in the back ground and the need for India to prove to its people and the world that it is capable of defending its interests and contribute to world peace too. With the increase in commitments, it is but natural that India's Armed Forces will be called upon to don the mantle of carrying India's flag across the oceans and continents. It is therefore important for India's defense forces to establish an independent and truly cohesive force to show the resolve of India's armed forces, a characteristic that has gained significant importance in the backdrop of the Mumbai terror attacks. Therefore, in the back drop of such a setting and the emerging world order, India definitely needs an independent amphibious force (See Annexure C - Salient Aspects of Organizational Setup and Proposed Force, pg 27). This will ensure India is not caught flat-footed when her interests are at stake, Diasporas are in need of succor, allies or any nation requires assistance and asks for it.

Appendix A
Annexure A – History of Amphibious Forces

"Amphibious warfare is military operations characterized by attacks launched from the sea by naval and landing forces against hostile shores. The main form is the amphibious assault, which may be conducted for any of several purposes: to serve as a prelude to further combat operations ashore; to seize a site required as an advanced naval or air base; or to deny the use of the site or area to the enemy. Landing of expeditionary forces on a shore or at a port already secured by friendly forces is not usually included in the concept."

The Encyclopedia Britannica Online [70]

The first known instance of amphibious warfare was the Persian campaign against Athens dating back to 490 B.C.[71] However, the first practitioner of modern amphibious operations was Peter the Great; tsar of Russia from 1682 to 1725.[72] The Royal Navy too caught on to this concept and became a constant practitioner of amphibious landings in subsequent European Wars.[73] The United States too became a regular practitioner of amphibious operations from 1775.[74] However, the Dardanelles campaign by the British during the First World War[75] almost sounded the death knell to naval operations involving amphibious forces. The assault at Gallipoli (Dardanelles) marked the first failure of a major amphibious assault.[76] The experiences of amphibious warfare in various theatres and leading up to the Second World War made the Americans realize the importance of careful training and preparation for amphibious operations. This realization led to the birth of the amphibious doctrine and organization of the Fleet Marine Force in 1933.[77] The Japanese too were involved in amphibious operations in the 1920s and 1930s. The amphibious operations were a major contributor to the Japanese expansionism in the Pacific before and during the Second World War.[78] The high water mark in terms of amphibious operations was at Normandy. The operation, christened Operation Overlord has been dubbed the greatest amphibious assault ever.[79] The confidence in amphibious operations that was lost after Gallipoli was reinstated at Normandy. The success at Normandy has seen many nations embrace the concept of amphibious operations.

Therefore what emerges is that some nations used amphibious operations/ warfare to primarily further their expansionist agenda --Japan to cite as an example. Countries also used amphibious warfare/ forces as a quasi-police force, anti-piracy force, and to further/ enforce their policies--the role of the United States Marines in late 1700s and early 1800s being examples.[80] Only after the world had settled down in to a period of turbulent peace after the Second World War did nations start using amphibious capability for humanitarian assistance too. One of the first instances of this was NEO--Operation Passage to Freedom undertaken by the Task Force 90 of the United States Armed Forces which involved the loading of Vietnamese refugees and French Union Military forces and equipment at Haiphong, French Indo-China from August to November 1954.[81] Therefore some of the reasons nations have used and maintain amphibious forces are--policing, anti-piracy, enforcing a nation's policies, and humanitarian assistance.

Annexure B – Indian Armed Forces in Various Conflicts/ Missions

Indian Armed Forces in Maldives. On November 3, 1988 at 0415 hrs the island of Male in the island nation of Maldives woke up to the sound of rockets and grenade attacks when a group of mercenaries landed. The mercenaries quickly overpowered the Maldivian Militia and attacked the President's residence. The Maldivian Government sent out calls asking for assistance. The Government of India was the first to respond. The Indian Cabinet approved the dispatch of forces on November 3, 1988 at 1530 hrs. Within six hours of cabinet approval, the 50 Independent Paratroop Brigade launched the Maldives operation, code named Operation Cactus. The first pair of Indian Air Force IL-76MDs taking off from Agra embarked elements of 6 Para Battalion and 17 Para Field Regiment (the regiment's heavy weapons unit). The first troops touched down at the airport in Huhule, an island 3 kms from the Maldivian capital Male after a non-stop 4 hour flight. The paratroopers made an uncontested landing and the island of Huhule was secured within 30 minutes. Two platoons from 6 Para then commandeered local boats to cross into Male. By 0230 hours on November 4th, President Gayoom had been located and escorted to safety. Shortly thereafter a vessel was seen fleeing Male and it was discovered that mercenaries were on board with hostages, including the Maldivian Minister of Education. The ship escaped only to be boarded by the Indian Navy the following day. The Indian Marine Special Force commandos (now known as the Marine Commando Force - MARCOS) boarded the vessel and took control without any resistance from the mercenaries.[82] (See Figure 7, pg 39)

Indian Armed Forces and the Asian Tsunami. The Tsunami struck South Asia, including India on Dec 26, 2004. The very next day the government of India ordered the armed forces to commence relief and rescue operations. The Indian Navy mobilized its assets to provide succor to people not only in India, but also in Sri Lanka, Indonesia, and Maldives. The Indian Navy

launched simultaneous operations in India (Operation Madad and Sea Wave), Sri Lanka

(Operation Rainbow), Maldives (Operation Castor), and in Indonesia (Operation Gambhir). The

rescue efforts saw the Indian Navy mobilizing 32 ships, 21 helicopters, 8 Dornier/Islander

aircraft and more than 5500 personnel for the operations[83] (see Figure 8, pg 40).

Indian Armed Forces in Lebanon. An example of the effectiveness of naval forces is the

Israeli- Hezbollah conflict of July-August 2006. The sudden flare up saw many non-combatants

caught up in between the fighting forces. This situation led many countries to launch operations,

mainly by the sea route, to evacuate their citizens from the war zone. India too mobilized its

forces to evacuate its citizens from Lebanon. India christened its evacuation efforts as Operation

Sukoon[84]. The operation saw all elements of national power work in harmony and provide much

required assistance. The conflict saw the Indian Navy initiating Operation Sukoon[85] which saw

four Indian Navy ships *Mumbai, Brahmaputra, Betwa,* and *Shakti* evacuating 2,280 persons from

Lebanon (see Figure 9, pg 40). They included not only Indian nationals but also nationals of Sri

Lanka, Nepal, Lebanon, and even some Greeks.[86]

Annexure C - Salient Aspects of Organizational Setup and Proposed Force

The composition and salient features of the force should be as mentioned below: -

    a. A Brigade consisting of three composite battalions of infantry and parachute troops with supporting arms and including the Marine Commandos. The amphibious force should at all times maintain a battalion as a "force in readiness" for deployment at immediate notice. The other two battalions can be involved in training, leave, and rest and recuperation.

    b. The force's surface shipping should have a minimum of two LHA/ LHDs, two LPDs and two LSDs, of which one each LHA/ LHD, LPD, and LSD would form part of the platforms available for the "force in readiness". Till such time these platforms are acquired/ built, the existing naval amphibious units should be utilized. Once the new platforms are acquired, there would be a need to take a re-look at the role and mission for the existing naval amphibious units including the possibility of selling/ gifting them to allies to bolster India's war ship building industry.

    c. The force's aircraft would primarily consist of the MiG-29K/ Sea Harrier fighter aircraft and Sea King helicopters. A more superior fighter/ helicopter for the force can be explored provided it is compatible with the flight deck of the proposed ships. The Indian Air force strategic lift assets and air to air refuellers would be requisitioned as required.

    d. The vehicles and equipment to be used by the force would essentially consist of the currently used equipment and vehicles, though catering for advances in technology. The equipment would however need to be modified as required catering for the mission at hand.

    e. The main training for the force should be ideally undertaken at the proposed amphibious warfare training school at Kakinada on the Eastern Sea board of India. However training facilities should also be made available at the force's home base. Similarly, the ships and

aircraft should be always available for real time training, barring the LHDs which may be tasked as required. But the LHDs too should be available for the maximum duration to ensure the force is completely au-fait with the platforms.

f. The command and control of the amphibious force should be under the theatre commander at Port Blair, Andaman and Nicobar Islands. The force commander, the senior most of the three services commanders of the force, should be directly responsible for the day to day running and administration of the force with the theatre commander tasking for all operational missions. The integrated defense staff would need to look after the equipment procurement and other material issues of the force.

g. The force needs to be based at Kochi to ensure optimum reaction time for India's likely areas of interest and influence.

Appendix B - Tables

Table 1 - Indian Navy's Amphibious Lift Capability

Sl.	Class of Ship	Number	Maximum Speed	Range	Troops	Total Troops	Vehicles/ Aircraft
a.	Austin Class Landing Platform Dock (LPD)	1	21 Knots	7,700 Nautical Miles at 20 Knots	930	930	4 LCM 8s + Up to 6 UH-3H Helicopters
b.	Magar Class Landing Ship Tank (LSTH)	3+2	15 Knots	3,000 Nautical Miles at 14 Knots	500	2500	4 LCVPs + Up to 2 Sea King 42 C Helicopters + 15 Tanks + 8 Armored Personnel Carriers
c.	Polnochny C and D Class Landing Ship Tanks (LSM/ LSMH)	5	16 Knots	3,000 Nautical Miles at 12 Knots	160	800	5 Tanks or 5 Armored Personnel Carriers or 5 AA guns or 8 Trucks
d.	Landing Craft (LSM)	6	11 Knots	1,000 Nautical Miles at 8 Knots	120	720	250 Tons; 2 PT-76 or 2 Armored Personnel Carriers

(Source: Jane's Fighting Ships 2007-08) [87]

Table 2 - Capabilities of the LHA, LHD, LPD and LSD (Based on Ships used by U.S. Navy)

(The capabilities of the Spanish and Australian LHDs is not being considered as it would be ideal to have larger ship, budget permitting)

	LHA	LHD	LPD (New)	LSD (Whidbey Class)
Displacement in Tons (Approx)	40,000	40,000	24,000	17,000
Speed				
Maximum	24	24	25	22
Sustained	22	22	22	20
Range (in Nautical Miles) @ Speed (in Knots)	10,000 @ 20	9,500 @ 20	7,700 @ 21	8,000 @ 20
Troops	1,700	1,700	720 (+100 for short duration)	560
Aircraft (Amphibious Role)				
Fixed Wing (Sea Harriers)	6	6	Not Applicable	Not Applicable
Rotary Wing	30	30	2 (Max)	Nil
Helicopter Landing Spots			2	Data Not Available
Aircraft (Aircraft Carrier Role)			Not Applicable	Not Applicable
Fixed Wing (Sea Harriers)	Data Not Available	20	-	-
Rotary Wing (ASW Capable)	Data Not Available	6	-	-
LCACs	1	3	2	4
LCU 1610s	4	2	1	3
Vehicle Square (in Square Feet)	28,700	24,012	25,000	11,831
Cargo Cube (in Cubic Feet)	156,000	145,000	35,000	8,970
Hospital Facilities				
Operating Theatres	4	6	2	1
Primary Ward Beds	48	36	24	2
Maximum Patients Bed Space	300	600	Data Not Available	Data Not Available
Flag Facilities	Yes	Yes	Limited	No
Tactical Air Control Center[‡]	Yes	Yes	No	No
Helicopter Direction Center	Yes	Yes	No	No
Helicopter Coordination Section	Yes	Yes	Yes	Yes
Helicopter Support Facilities	Yes	Yes	Yes	No

(Source: Naval Institute Guide to the Ships and Aircraft of the U.S. Fleet, By Norman Polmar and US Marine Corps Publication MCRP 3-31B Amphibious Ships and Landing Craft)

[‡] A very important part of amphibious operations when the airspace is required to be controlled to ensure de-confliction.

## Table 3 - Capabilities of LCAC and LCU

	LCAC (Post Life Extension)	LCU (Latest Version)
Displacement in Tons (Full Load)	169	390
Speed (Maximum) in Knots	40 +	20-25
Range (in Nautical Miles) @ Speed (in Knots)	200 @ 40	1,000
Troops	24	8
Troop Capacity on Deck	Data Not Available	400
Cargo Deck (in Square Feet)	1,809	1,850
Cargo Capacity (Designed) in Tons	144	225

(Source: Naval Institute Guide to the Ships and Aircraft of the U.S. Fleet, By Norman Polmar and US Marine Corps Publication MCRP 3-31B Amphibious Ships and Landing Craft)

Table 4 - Distances (in Nautical Miles along Great Circle) of Principal Indian Ports vis -a-vis Main Points of Interest

	Persian Gulf	Bab El Mandeb (Gulf of Aden)	Cape of Good Hope	Straits of Malacca	Red Sea (Saudi Arabia)
Port Blair	2525	2900	5042	700	3107
Visakhapatnam	1874	2334.3	4835.5	1398	2495
Chennai	1844.6	2163.2	4523.2	1402.2	2377
Kochi	1755.9	1943.7	4221.2	1563.5	2200
Mumbai	1298	1745.2	4448.7	1944.1	1892

(Distance Calculator Source: http://www.infoplease.com/atlas/calculate-distance.html (accessed January 10, 2009)

Appendix C - Figures

Indian real GDP growth 1/

Percent
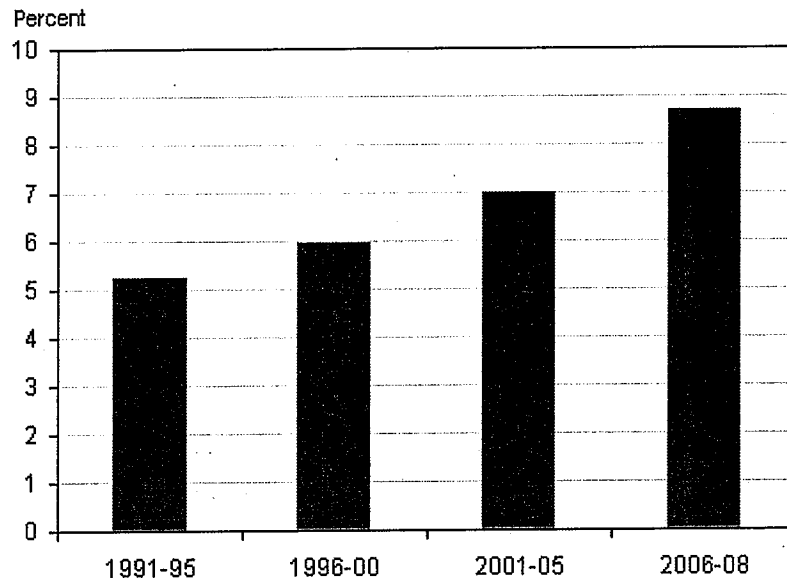
1/ Adjusted for inflation.
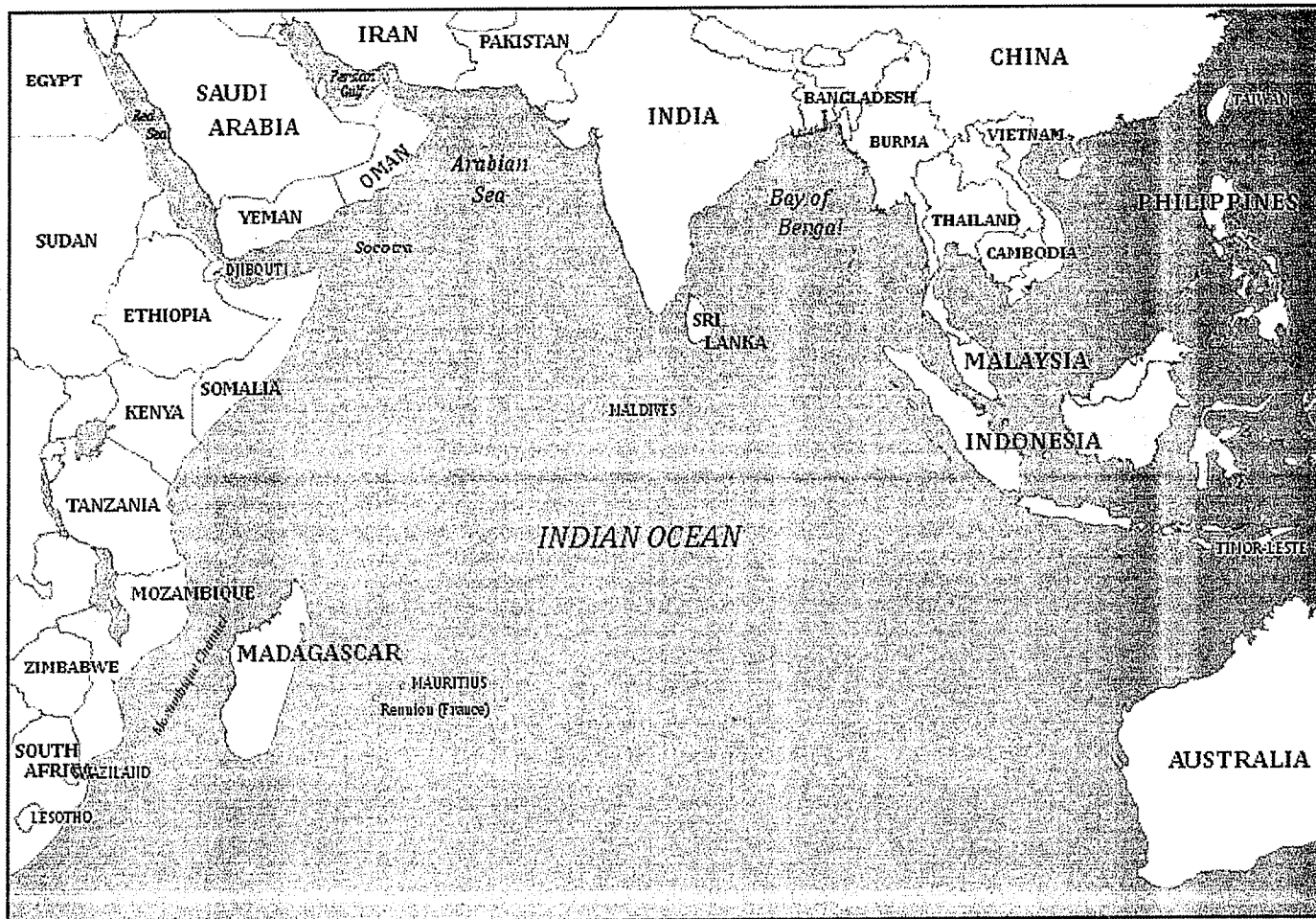Source: Government of India, Ministry of Finance, Economic Survey.

Figure 1 - India's GDP Figures
(Source: http://www.ers.usda.gov/briefing/india/basicinformation.htm (accessed February 1, 2009))
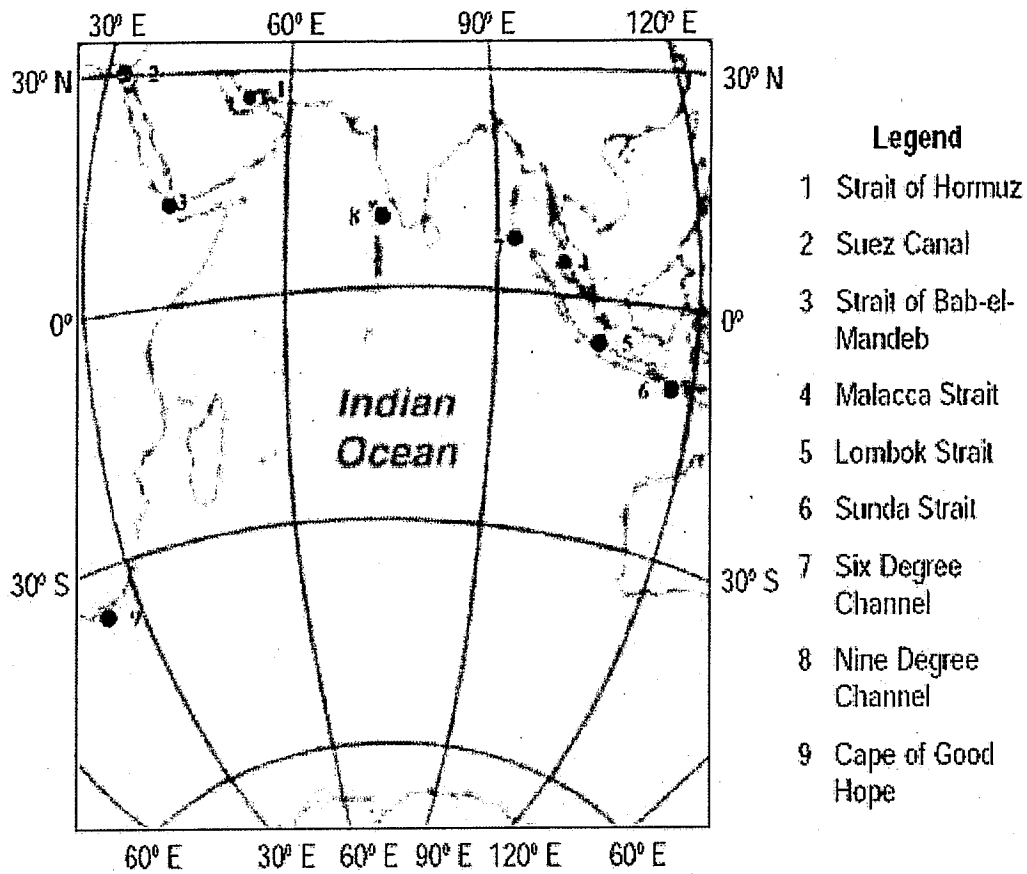
Figure 2 - India's Island Territories

(Photo Source: www.yourchildlearns.com/.../indian-ocean.gif)

(Link: http://images.google.com/imgres?imgurl=http://www.yourchildlearns.com/online-atlas/continent/images/indian-ocean.gif&imgrefurl=http://www.yourchildlearns.com/online-atlas/continent/indian-ocean-map.htm&usg=__m0zRSgH10XpO1dwdYsq282oHgks=&h=557&w=804&sz=105&hl=en&start=4&um=1&tbnid=OSjC-fgc5BXm2M:&tbnh=99&tbnw=143&prev=/images%3Fq%3Dindian%2Bmaps%2Bof%2Bindian%2Bocean%26um%3D1%26hl%3Den%26rls%3Dcom.microsoft:*)
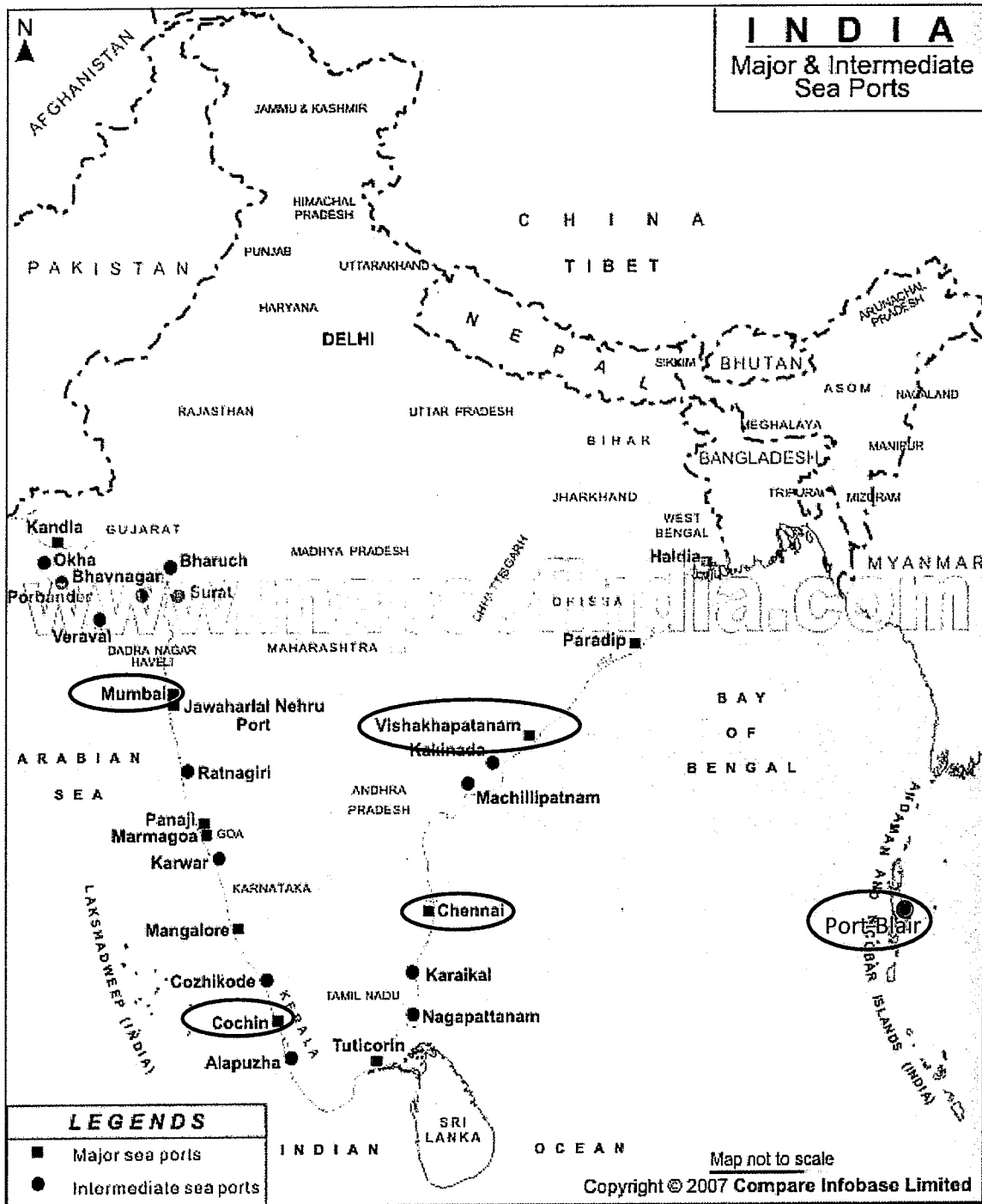
Figure 3 - India's Unique Location

Figure 4 - Important Passages into the Indian Ocean

Legend

1 Strait of Hormuz

2 Suez Canal

3 Strait of Bab-el-Mandeb

4 Malacca Strait

5 Lombok Strait

6 Sunda Strait

7 Six Degree Channel

8 Nine Degree Channel

9 Cape of Good Hope

(Photo Source: Indian Navy's Maritime Military Strategy Document, 23)
Figure 5 - Marine Commandoes

(Map Source: http://www.mapsofindia.com/maps/india/india-map-sea-ports.jpg (accessed January 16, 2009))

Figure 6 - Bases for Amphibious Force
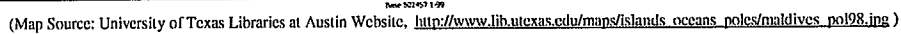
Figure 7 - Maldives

(Photo Source: Indian Navy Website, http://indiannavy.nic.in/images/deployments/indisasterrelief.jpg)
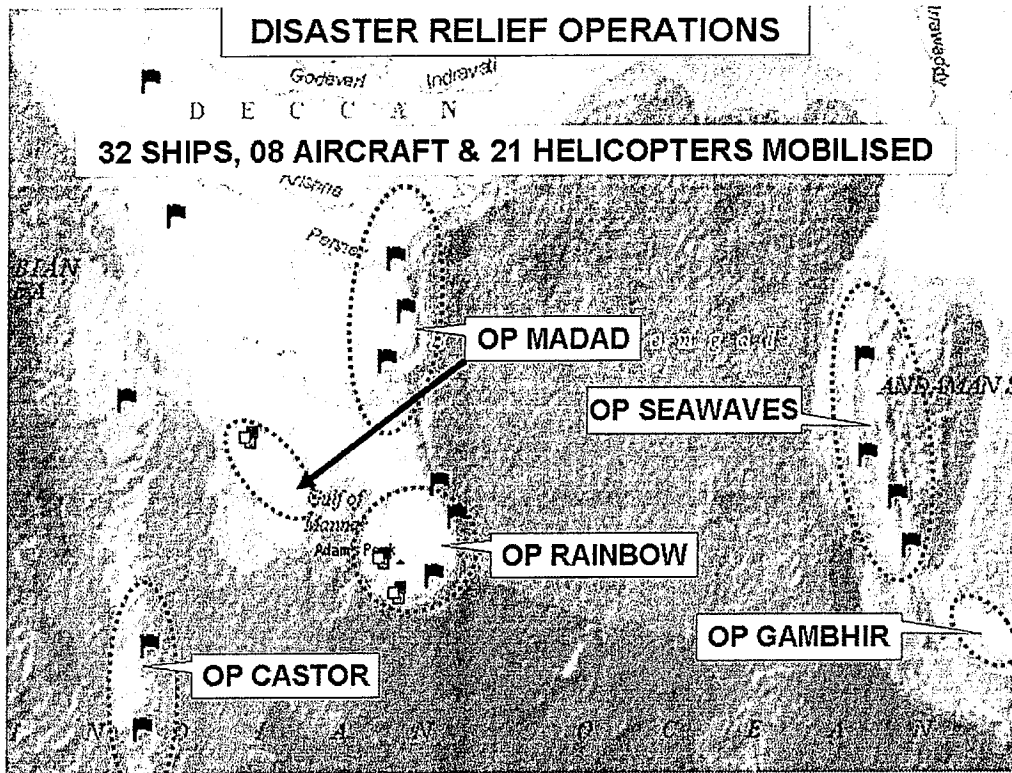
Figure 8 - Indian Naval Disaster Relief Operations post Tsunami in 2004

(Photo Source: Indian Navy Website, http://indiannavy.nic.in/sukoon.pdf)
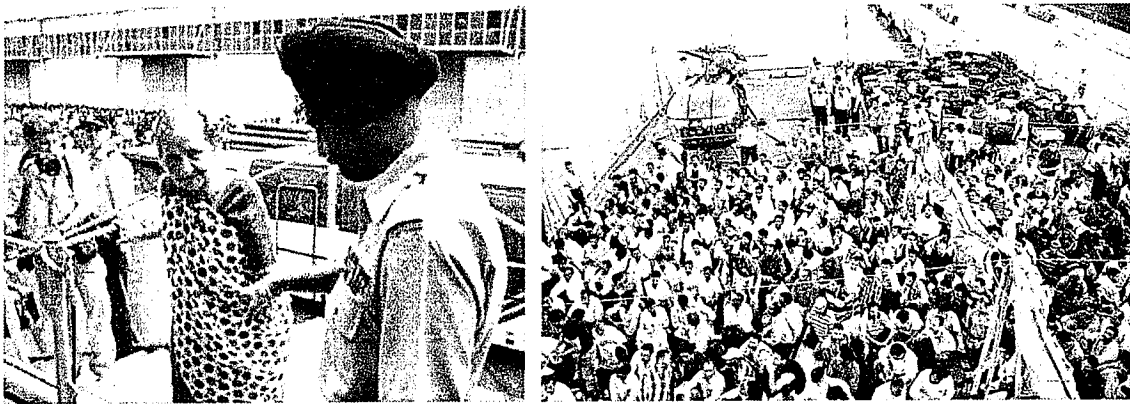
Figure 9 - Operation Sukoon

Bibliography

Evans, Col. M.H.H. *Amphibious Operations - TheProjection of Sea Power Ashore.* London: Brassey's, 1990.

Headquarters U.S. Marine Corps . *Amphbious Ships and Landing Craft Data Book.* MCRP3-31B. Wasington, DC: Headquarters U.S. Marine Corps, August 29, 2001.

Mills, Wing Commander Chris, RAAF. "The Case for the Development of A Multi-Mission Ship in the Australian Defense Force." *Australian Army Journal* (Land Warfare Studies Center) II, no. 2 (Autumn 2005): 57-68.

Navy, Indian. *Freedom to use the Seas: India's Maritime Military Strategy.* New Delhi: Integrated Headquarters Ministry of Defence (Navy), 2007.

Perrett, Bryan. *British Military History for Dummies.* John Wiley and Sons, 2007.

Polmar, Norman and Peter B. Mersky. *Amphibious Warfare - An Illustrated History.* London, New York, Sydney: Blandford Press, 1988.

Polmar, Norman. *Naval Institute Guide to Ships and Aircraft of the U.S. Fleet.* 18th Edition. U.S. Naval Institute Press, 2005.

Rodgers, William L. Marathon,490 B.C. Edited by Lt. Col. Merrill L. Barlett. *Assault from the Sea - Essays on the History of Amphibious Warfare.* Annapolis, MD: Naval Institute Press, 1983.

Ross, Lt. Gen. Sir Robert. "The Role of Amphibious Forces in a Changing World." *RUSI Journal 141, no.2,* (April 1996): 21-23.

Saunders, Commodore Stepthen, ed. *Jane's Fighting Ships 2007-2008.* UK: Cambridge University Press, 2008.

Singh, Rear Admiral (Retd.) Satyindra. "Blue Print to Blue Water." *Indian Navy official web site.* http://www.indiannavy.nic.in/bptobw.pdf (accessed Dec 08, 2008).

[1] Arvind Panagariya, *"India's Economic Reforms: What Has Been Accomplished? What Remains to Be Done? ,"* Asian Development Bank ERD Policy Brief Series, Policy Brief No.2, http://www.adb.org/Documents/EDRC/Policy_Briefs/PB002.pdf (accessed February 1, 2009).

[2] Economic Research Service, *"India Basic Information,"* United States Department of Agriculture, http://www.ers.usda.gov/briefing/india/basicinformation.htm (accessed February 1, 2009).

[3] Ministry of Finance, Government of India, *"Economic Survey 2007-2008,"* http://indiabudget.nic.in/es2007-08/chapt2008/chap13.pdf (accessed February 1, 2009).

[4] Shri K.C.Pant, India's Planning Commission Deputy Chairman, *"Defense Strategy Must Look Beyond Present Threat,"* Press Information Bureau October 13, 1999, http://www.fas.org/news/india/1999/991013-india-def.htm (accessed January 16, 2009).

[5] Government of India Official Website, http://india.gov.in/knowindia/profile.php (accessed December 08, 2008)

[6] *"India's Security Environment Overview,"* Ministry of Defence, Government of India Official Web site, http://mod.nic.in/aforces/welcome.html (accessed December 14, 2008)

[7] Rear Admiral Satyindra Singh, *Blue Print to Blue Water.* http://www.indiannavy.nic.in/bptobw.pdf (accessed December 9, 2008), 1.

[8] Indian Navy, *India's Maritime Military Strategy* (New Delhi, India: Integrated Headquarters Ministry of Defense (Navy)), 25; http://indiannavy.nic.in/maritime_strat.pdf (accessed December 08,2008).

[9] Ibid., 33-37.

[10] Indian Navy, *Maritime Strategy,*10.

[11] Pant, http://www.fas.org/news/india/1999/991013-india-def.htm (accessed January 16, 2009).

[12] Ministry of Defense, Government of India official web site, *Security Environment- An Overview,* http://mod.nic.in/aforces/welcome.html (accessed February 4, 2009).

[13] Michael Rubenstein and others, *"At least 100 dead in India Terror Attacks,"* The New York Times – Asia Pacific Section, nytimes.com, November 27, 2008, http://www.nytimes.com/2008/11/27/world/asia/27mumbai.html (accessed February 4, 2009).

[14] Times of India, *"India a terribly Soft State: US Experts,"* Times ofIndia.com, January 30, 2009, http://timesofindia.indiatimes.com/India/India_a_terribly_soft_state_US_experts/articleshow/4049805.cms (accessed February 4, 2009).

[15] *"The Lessons of Mumbai,"* January 9, 2009, RAND Corporation, Occasional Paper Series, RAND corp.org, http://www.rand.org/pubs/occasional_papers/2009/RAND_OP249.pdf (accessed February 4, 2009).

[16] Ministry of Defense web site, *National Security Objectives* (accessed December 14, 2008).

[17] *"Joint Doctrine for Amphibious Operations Released,"* *India-Defence.com,* http://www.india-defence.com/reports-4010 (accessed December 14, 2008).

[18] "Amphibious Warfare," Absolute Astronomy.com, http://www.absoluteastronomy.com/topics/Amphibious_warfare (accessed December 14, 2008).

[19] "Indian Troops at Gallipoli:1915," The Encyclopedia of New Zealand, http://www.teara.govt.nz/NewZealanders/NewZealandPeoples/Indians/3/ENZ-Resources/Standard/1/en (accessed December 14, 2008).

[20] Marika Sherwood, "Colonies, Colonials and World War Two," http://www.bbc.co.uk/history/worldwars/wwtwo/colonies_colonials_01.shtml (accessed December 14, 2008).

[21] "Indian Peace Keeping Operations," http://www.indianchild.com/india_peace_keeping_operations.htm (accessed January 24, 2009).

[22] Indian Armed Forces Official Website, "Operation Pawan," http://armedforces.nic.in/navy/pawan.htm (accessed December 15, 2008)

[23] "Marine Commandos," Bharat Rakshak.com http://www.bharat-rakshak.com/NAVY/Marines.html (accessed December 15, 2008).

[24] Indian Navy Official Website, http://indiannavy.nic.in/ships.htm (accessed December 14, 2008).

[25] Marine Commandos, Bharat Rakshak.com, (accessed December 14, 2008).

[26] Country Analysis Briefs, "India," Energy Information Administration, eia.doe.gov, pg 3, http://www.eia.doe.gov/emeu/cabs/India/pdf.pdf (accessed February 5, 2009).

[27] Colonel SA Rehman, "Jointmanship-The IDS Way," Articles by Officers of Headquarters of Integrated Defence Staff, http://ids.nic.in/art_by_offids/Jointmanship%20-%20The%20IDS%20Way%20%20by%20Col%20SA%20Rehman.pdf (accessed December 15, 2008)

[28] Sara Goudarzi, "Flocking to the Coast-World's Population Migrating into Danger," Live Science.com July 18, 2006, http://www.livescience.com/environment/060718_map_settle.html (accessed January 24, 2009).

[29] "Indian Army," Global Security.Org, http://www.globalsecurity.org/military/world/india/army.htm (accessed January 2, 2009).

[30] Maj. Anthony S. Lieto, "Amphibious operations: The Operational Wild Card," (School of Advanced Military Studies, United States Army Command and General Staff College Fort Leavenworth, Kansas, 1989-90)

[31] Indian Army, Global Security.Org (accessed January 2, 2009).

[32] Marine Commandos, Bharat Rakshak.com (accessed January 2, 2009).

[33] Indian Army, Global Security.Org (accessed January 2, 2009).

[34] Maj Jeffrey R. Earley, USA, "Marine Airborne Operations as part of the Amphibious Assault," (thesis, Marine Corps University Command and Staff College, 1988), Executive Summary, http://www.globalsecurity.org/military/library/report/1988/EJR.htm (accessed January 2, 2009)

[35] Indian Army, Global Security.Org (accessed January 2, 2009).

[36] "US Marine Corps Force Recon," http://www.usmarinerecon.com/index.html (accessed January 2, 2009).

[37] *Marine Commandos*, Bharat Rakshak.com (accessed January 2, 2009).

[38] "Indian Navy Commissions INS Jalashwa at Naval Station Norfolk," Global Security.Org http://www.globalsecurity.org/military/library/news/2007/06/mil-070622-nns07.htm (accessed January 2, 2009) "India Plans to build three Amphibious Assault Ships (LPD)," Express news service article published in freerepublic.com September 14, 2007 http://www.freerepublic.com/focus/f-news/1896499/posts (accessed January 4, 2009)..

[39] "Landing Docks on Navy's Periscope," Bharat Rakshak.com September 14,2007, http://www.bharat-rakshak.com/NEWS/newspage.php?cur=50&force=AL&month=9&year=2007 (accessed January 4, 2009) and "India Plans to build three Amphibious Assault Ships (LPD)," Express news service article published in freerepublic.com September 14, 2007 http://www.freerepublic.com/focus/f-news/1896499/posts (accessed January 4, 2009).

[40] Wing Commander Chris Mills, RAAF, "The Case for the development of a Multi-Mission Ship for the Australian Defense Force," Australian Army Journal Volume II, no.2 (Autumn 2005): 57-68.

[41] Norman Polmar, "The Naval Institute Guide to the ships and aircraft of the U.S. Fleet," (U.S. Naval Institute Press, 2005), 184.

[42] "Indian Aircraft Carrier (Project-71)," Bharat Rakshak.com, http://www.bharat-rakshak.com/NAVY/ships/future/185-indian-aircraft-carrier.html (accessed January 5, 2009).

[43] Polmar, 184 & 187.

[44] Ibid., 207 & 201.

[45] "24th Transportation Battalion," Global Security.Org, http://www.globalsecurity.org/military/agency/army/24trans.htm (accessed January 16, 2009).

[46] "Australian Defense Amphibious Ships Project," tomw.net.au, http://www.tomw.net.au/technology/transport/amphibious.shtml (accessed January 8, 2009) and "Navantia and Tenix to Build Two Amphibious Ships for the Royal Australian Navy," Deagel.com, http://www.deagel.com/news/Navantia-and-Tenix-to-Build-Two-Amphibious-Ships-for-the-Royal-Australian-Navy_n000003161.aspx (accessed January 8, 2009).

[47] "First Steel cut for Spanish LHD," *Jane's Defense Weekly*, July 6, 2005, Strategy Page.com, http://www.strategypage.com/militaryforums/512-13141.aspx (accessed January 8, 2009).

[48] Polmar, 190.

[49] Ibid., 191.

[50] Ibid., 194.

[51] Ibid., 190.

[52] Ibid., 191.

[53] Ibid., 196.

[54] Mills, 57.

[55] Ibid., 58.

[56] Indian Navy Website, "Aircraft and Helicopters," http://indiannavy.nic.in/helicoptor.htm (accessed January 8, 2009).

[57] "Mig-29K/ KUB *Fulcrum*-D," Bharat Rakshak.com, http://www.bharat-rakshak.com/NAVY/MiG-29K.html (accessed January 8, 2009).

[58] Quotation details, quotations page.com http://www.quotationspage.com/quote/35511.html (accessed January 8, 2009).

[59] "Naval Enclave will enhance maritime security: Pallam Raju," *The Hindu,* June 25, 2008, http://www.hindu.com/2008/06/25/stories/2008062554730500.htm (accessed January 8, 2009) and "Indian Navy to get Amphibious Warfare School," http://news.indiamart.com/news-analysis/indian-navy-to-get-a-19214.html (accessed January 8, 2009).

[60] Integrated Defense Staff (IDS) Official Web site, "Integrated Defense Staff: History," http://ids.nic.in/history.htm (accessed January 8, 2009).

[61] IDS Organization, http://ids.nic.in/organisation.htm (accessed January 10, 2009).

[62] IDS, *"Andaman and Nicobar Command,"* http://ids.nic.in/ancommand.htm (accessed January 10, 2009) and Government of India, Press Information Bureau,*"Andaman Nicobar Command Celebrates fourth Raising day,"* http://pib.and.nic.in/releases/anc4day.htm (accessed January 10, 2009).

[63] "Andaman and Nicobar Command," Global Security. Org, http://www.globalsecurity.org/military/world/india/anc.htm (accessed January 10, 2009).

[64] Indian Navy, *Maritime Strategy,*59-60.

[65] "Indian Naval Bases," Global Security. Org, http://www.globalsecurity.org/military/world/india/ports.htm (accessed January 11, 2009).

[66] "Navantia Designs are chosen for Australia's AWD and LHD," Sea Power, August 2007,BNET, http://findarticles.com/p/articles/mi_qa3738/is_200708/ai_n19511398 (accessed January 10, 2009).

[67] "LHD-1 Wasp class References," Global Security. Org, http://www.globalsecurity.org/military/systems/ship/lhd-1-program.htm (accessed January 10, 2009).

[68] India Defence, "10 percent hike in Indian Defence Budget for 2008-09," http://www.india-defence.com/reports-3759 (accessed January 10, 2009).

[69] Vice Admiral (Retd.) Parvesh Jaitly, "*Modernising India's Navy,*" SP Military Yearbook.net, http://www.spsmilitaryyearbook.net/story.asp?Book=1&Article=23 (accessed January 28, 2009).

[70] Encyclopedia Britannica Online, " Amphibious Warfare,"
http://www.britannica.com/EBchecked/topic/21501/amphibious-warfare (accessed January 21, 2009).

[71] Rodgers, William L. *Marathon, 490 B.C.*, ed. Lt. Col. Merrill L. Barlett. *Assault from the Sea - Essays on the History of Amphibious Warfare* (Annapolis, MD: Naval Institute Press, 1983),4.

[72] Polmar and Mersky, 8.

[73] Ibid., 9.

[74] Ibid., 16.

[75] Ibid., 10.

[76] Ibid., 14.

[77] Ibid., 20.

[78] Ibid., 23.

[79] "Naval Leaders-Adm Bertram Ramsay," Royal Navy.mod.uk
http://www.royalnavy.mod.uk/server/show/nav.3892 (accessed January 14, 2009) and Bryan Perrett, "British Military History for Dummies," (John Wiley and Sons, 2007) 365, accessed at google book search
http://books.google.com/books?id=6J6-ZD9I6bIC (accessed on January 14, 2009).

[80] Polmar and Mersky,17.

[81] Beach Master Unit, "History," http://www.bmu1.navy.mil/site%20pages/history.aspx (accessed January 21, 2009).

[82] "Operation Cactus," Bharat-Rakshak.com, http://www.bharat-rakshak.com/ARMY/History/1970s/Operation-Cactus.html (accessed January 16, 2009).

[83] Indian Navy Official Website, http://www.indiannavy.nic.in/press%202005/pres81.htm (accessed December 08, 2008) and Disaster Relief Operations, http://indiannavy.nic.in/images/deployments/indisasterrelief.jpg (accessed January 11, 2009).

[84] M. Rama Rao, "Operation Sukoon to lift Indians, Sri Lankans and Nepalese from Lebanon," Asian Tribune, July 20, 2006, http://www.asiantribune.com/index.php?q=node/1170 (accessed January 6, 2009).

[85] Indian Navy, "Op Sukoon," http://indiannavy.nic.in/sukoon.pdf (accessed January 11, 2009).

[86] Mr. Pranab Mukherjee. "Admiral A.K. Chatterjee Memorial Lecture" (Lecture, Indian Navy Foundation, Kolkata, India, Jun 30, 2007), http://meaindia.nic.in/speech/2007/06/29ss01.htm (accessed December 08, 2008)

[87] Commodore Stephen Saunders RN, ed. *Jane's Fighting Ships 2007-2008*, (UK: Cambridge University Press, 2008), 330.